# Q-ing for health: a new approach to eliciting the public's views on health care resource allocation

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## ABSTRACT

The elicitation of societal views about health care priority setting is an important, contemporary research area and there are a number of studies which apply either qualitative techniques or quantitative preference elicitation methods. However there are methodological challenges in connecting qualitative information (what perspectives exist about a subject) with quantitative questions (to what extent are those perspectives 'supported' in a wider population). In this paper we present an integrated, mixed-methods approach to the elicitation of public perspectives in two, linked studies applying Q methodology. In the first study we identify three broad viewpoints on the subject of health priorities. In the second study, using Q-survey methods, we describe and illustrate methods to investigate the distribution of those views in the wider population. The findings of the second study suggest that no single viewpoint dominates and none of the three views represents a 'minority perspective'. We demonstrate the potential of Q methodology as a methodological framework which can be used to link qualitative and quantitative questions and suggest some advantages of this over other approaches. However, as this represents the first applied study of this kind, there are methodological questions that require further exploration and development.

# 1 INTRODUCTION

The principles underlying the allocation of scarce health care resources are a matter of political, academic and public debate. In the last decade this debate has centred on the practices of Health Technology Assessment (HTA) agencies. In England, the National Institute for Health and Clinical Excellence (NICE) evaluates the clinical and cost effectiveness of health technologies and makes recommendations to the National Health Service (NHS) with respect to what should (and should not) be provided. Although central to their recommendations, HTA agencies rarely base their recommendations *solely* on the results of economic evaluations and other factors are also given consideration by the NICE Appraisal Committee. These other factors usually relate to equity and the distributive justice of health care resource allocation (Rawlins et al., 2009, Littlejohns et al., 2012). For example, there are illnesses for which available treatments deliver very limited health benefits, but the provision of such treatments may, for other reasons, be deemed socially valuable. In their supplementary guidance for the appraisal of end of life technologies, NICE have specified criteria under which a higher cost per QALY will be accepted for life-extending treatments for patients with terminal illnesses (NICE, 2009). Rawlins et al. (2009) list six examples of 'special circumstances' which have influenced NICE technology appraisals, attaching additional weight to the benefits of specific treatments to reflect the perceived social value of treatments for certain patient groups. Such policies and practices imply that some health gains for certain groups

of patients or categories of disease are valued more highly than others. However there is a paucity of rigorous research investigating the views of the general population in relation to the social values that should underpin health care resource allocation and Buxton and Chambers (2011) highlight the lack of and importance of empirical research to establish, "what values the public want their health care systems to use in evaluating technologies".

In addressing this research problem, there are two key research questions. The first is a qualitative question, "*What are* the views of the public regarding how health care resources should be distributed?" If such views can be elicited and described, there naturally follows a quantitative question, "to what extent are such viewpoints supported in the wider population?" Assuming plurality in public opinion we might be interested to measure the extent of support for an ideology or 'value-set' both in terms of i) how many people associate themselves with each perspective and ii) the strength of their preference for each perspective. Whilst there are a number of studies examining public views on social values and priority setting in health, both qualitative and quantitative (Cookson and Dolan, 1999, Coast, 2001, Bryan et al., 2002, Wiseman et al., 2003, Dolan et al., 2005, Baker et al., 2010a, Bombard et al., 2011), connecting qualitative and quantitative approaches within a single research project is challenging. Part of the difficulty relates to the fact that qualitative and quantitative research methods are associated with different epistemological foundations – something which has been noted in the health economics literature (Coast et al., 2004) as well as more broadly (Bryman, 2007).

Using Q methodology, this paper presents an integrated approach to understanding the nature and the distribution of societal views within a single methodological framework. Q methodology (Stephenson, 1953, Watts and Stenner, 2012) is arguably a rare example of an integrated approach that *combines* qualitative and quantitative techniques (Brown, 1996). Although Q studies have typically addressed research questions which are qualitative in nature (and there are many examples of this type of application in health research (Baker, 2006, Mason et al., 2010, Stainton Rogers, 1991, Stenner et al., 2003)) there are a few recent examples of the use of Q methods in survey research (Brown, 2002, van Exel et al., 2008). Whilst Q methods are well-established, Q *survey* methods have rarely been applied and there remain questions about the best approach to design and analysis of Q surveys.

We illustrate the use of Q methods in eliciting societal perspectives regarding health care priorities by presenting first a study to identify and describe shared views about the appropriate principles for health care resource allocation ('Study 1'); then in a second, linked study we apply Q survey methods to the 'measurement' of such views in a survey of the general population ('Study 2').

## 2 STUDY 1

The aim of study 1 is to identify and describe the perspectives that exist about resource allocation in health care in the general public in England. The Q study reported in this paper was designed as part of a wider study which is reported in full

elsewhere (Baker et al., 2010a). This study did not require the approval of an ethics committee.

## 2.1 Methods

Q methodology is appropriate when addressing questions about matters of opinion, values and beliefs, and produces in-depth descriptions of the shared viewpoints that exist around a given subject matter. It is characterised by two key features: the 'Q sort' and '*by-person'* factor analysis (Watts & Stenner (2012)). The Q sort provides the primary data source and involves respondents sorting cards printed with statements onto a grid, ranking them according to a 'condition of instruction', for example: arranging the cards from 'most like me' to 'most unlike me'. Factor analytic techniques are then used to identify patterns of similarity between respondents' Q sorts. The resulting factors represent shared viewpoints, and each factor can be represented as a distinctive ordering of the original set of statements. This ordering of the Q set for each factor is known as the 'factor array' and is simply a composite or idealised Q sort, generated by merging the Q sorts contributing towards each factor. These composite Q sorts provide the basis for factor interpretation. In addition, each respondent's Q sort is correlated to a greater or lesser degree with each factor, and this correlation coefficient is known as a 'factor loading'. Since many of these terms may be unfamiliar a glossary is provided (see Appendix A).

## The Q-set

The statement set (known as the "Q set") was designed, according to Q methodological conventions, in order to represent the range of 'conversational possibilities' about the subject in question. Statements can be identified from existing sources (newspapers or television, internet discussion boards, government publications) or generated in discussions in focus groups or interviews with key informants. Constructing items for inclusion in a Q set is quite different than item development in survey research. Survey instruments require that items are interpreted in the same manner by each respondent insofar as is possible. Great efforts are made to eliminate ambiguity in survey items and pilot testing aims to tighten wording - where multiple interpretations exist, items are revised and simplified so that the probability of different interpretations is reduced. In a Q study respondents are *expected* to interpret items differently. Statements are designed to retain the language used in conversations, with the inherent looseness and ambiguity that implies.

The analysis and interpretation of Q data focuses on respondents' rank ordering of statements *in relation to all* other statements and Q sorts are examined as a 'whole'. The focus of Q analysis is an examination of the relative importance and patterning of complementary or competing arguments, which are shared by clusters of people. Thus the two central concerns in Q set design are coverage (of ideas or views) and

balance (such that people who hold different views can express their views through the statements in the Q set) (Watts and Stenner, 2012).

The Q set for this study was generated in focus group discussions with members of the public in Newcastle upon Tyne and Norwich in 2005. As part of an introductory presentation, participants were advised that health care resources are finite, and so decisions must be made about the types of treatments that are (and are not) provided. They were asked to suppose that they were advising NHS 'decision makers' and to suggest factors that should be taken into account in setting priorities. Whilst following the same broad agenda, group discussions and the level of input and prompting by the facilitator varied. As well as open ended questions, a range of ranking and choice exercises were used to stimulate discussion (see Baker et al (2010a) and Lancsar (2011)).

In total 45 people took part in these discussions which were audio recorded and transcribed. A long-list of candidate statements was generated by identifying all expressions of belief, opinion or value that were relevant to priority setting in health. This long-list was reviewed by the research team in order to identify any issues which, from a theoretical or policy perspective, may be missing. One area of policy debate not mentioned by respondents related to prioritising treatments for rare illnesses where no other treatment is available and, following consideration by the research team, a statement was inserted (see statement #33, Table 1).

By deleting duplicates and statements of opposite meaning and merging very similar statements, 46 distinct statements were identified and printed onto cards. This

preliminary Q set was piloted by a sample of the general public and a sample of Newcastle University staff members (49 pilot respondents in total) who were asked to undertake the card sort exercise individually and to identify any problems or omissions. (This is a large sample for a pilot study to test a Q set and simply reflects the opportunistic recruitment of pilot respondents in a staff meeting). On this basis the Q-set was refined and the revised. A final set of 46 statements is reproduced in Table 1.

[TABLE 1 ABOUT HERE]

## Data collection

Small respondent samples are required in Q methodology since the aim is to identify and describe shared perspectives on an issue. In the same way that qualitative sampling methods cease at a point of 'data saturation', when it is judged that additional respondents will add little new information, once perspectives can be described by the factors that emerge in a Q study, additional respondents will add little to the interpretation of the data.

Q sorts were conducted by 27 individuals who attended five 'Q sort focus groups'. After an introductory presentation explaining the study, assuring anonymity and answering any questions, participants were guided through the Q sort exercise. They were asked to consider each statement in turn and assign it in a quick, initial sort, to one of three piles: agree, disagree, or neutral. A more detailed arrangement of cards followed, using the grid reproduced in Figure 1.

[FIGURE 1 ABOUT HERE]

Each space in the grid indicates the positioning of a card from -5 to +5. Respondents were asked to select two statements to place in the two 'most agree' (+5) spaces on the grid, then two statements to place in the 'most disagree' positions at '-5'. Four items were then selected and placed in the '+/-4' positions and so on. This was repeated until all 46 cards were placed. The arrangement of the cards was then recorded together with some demographic details. This was followed by a group discussion which was audio recorded and transcribed to aid interpretation of findings.

## Analysis

Using Q factor analytic techniques, common patterns between the Q sorts were identified. In this analysis, centroid factor extraction was followed by varimax rotation using PQMethod software (Schmolck, 2002). Centroid factor extraction tends to be preferred to Principal Components Analysis in Q methodology because it permits multiple possible solutions, allowing theoretical and abductive reasoning to be brought to bear rather than mathematically determinate solutions (see Watts & Stenner (2012) page 99 and Brown (1980) p33, 56-7). In this way, the analyst can explore hunches or theories by examining different factor solutions, and relate potential factor interpretations to the existing literature or to respondents' comments during discussions or post Q sort interviews.

For Q factor analysis the selection of a factor solution involves an assessment of whether factors are amenable to interpretation and represent coherent narratives, together with a number of statistical issues including: the number of significant factor loadings on each factor; the number of confounded factor loadings (i.e. Q sorts with significant loadings on more than one factor); and the number of null loadings (i.e. Q sorts which are not associated with any factor). (The percentage of variance explained by each factor and eigenvalues may also be examined). Qualitative data (in the form of respondents' comments) contribute towards interpretation and theoretical considerations may come into play. There is often more than one plausible solution (as was the case here) and judgement guides the selection of a factor solution which best summarises the data. The main source of information for interpretation of Q factors is a 'composite' Q sort (known as a factor array). To calculate the factor array for a given factor, Q sorts are weighted according to their factor loading on that factor (see Watts & Stenner (2012) p129-133) and an merged Q sort is estimated representing a *shared* viewpoint (see Figure 2). Factors are interpreted by examining the relative position of statements within each factor array as a whole and, with the help of respondents' comments, constructing a narrative around each factor. Statements placed in the most agree/disagree positions are important in the interpretation of factors, as are d*istinguishing statements* (those placed significantly differently between factors) and *consensus statements* (those which are not placed significantly differently between factors).

A range of factor solutions based on 1 to 5 factors were considered for interpretation and a three factor solution was selected on the basis of the clarity and coherence of the accounts produced in factors 1 and 2 and the distinguishing features of factor 3. Single and 2 factor solutions were examined in detail but will not be reported here.

## 2.2 Study 1 findings

27 respondents (aged 20-84, 11 female) completed Q sorts. Factor loadings indicating each respondent's association with each factor are presented in Table 2.

[TABLE 2 ABOUT HERE]

Table 1 lists the 'factor scores' (-5 to +5), which indicate the position of each statement for each factor, and highlights significantly distinguishing and consensus statements. Figure 2 presents the factor arrays on the sorting grid for each factor. The following sections describe the three factors identified. To avoid repetition of statements in full, we use an abbreviated form to represent factor scores for a given statement. Consider statement 13 ("*Age shouldn't come into it, unless you're talking about children. Children's health should be given priority over adults*"). It is placed in the neutral position for factors 1 and 2 but has a high, positive score in factor 3 (see Table 1). It also significantly distinguishes factor 3. This is represented as follows: #13[**0**,0,4*]. The factor score for the factor in question is emboldened, the asterisk indicates that the statement is significantly distinguishing ($p<0.01$). (In this example reference is being made to factor 1 and the statement significantly distinguishes factor 3.)

[FIGURE 2 ABOUT HERE]

## Factor 1: egalitarianism, access and entitlement

Factor 1 is an egalitarian view of health care priorities. The statements of importance in this factor together reveal a belief that people are equal and deserve equal treatment. The magnitude of health benefits and efficiency in the distribution of scarce health resources are not of primary importance (#31[**2***,4,4]), because the emphasis here is on entitlement and equality of *access* to health care, rather than outcome. Almost every statement placed in the most agree positions (#11* and #15* placed at **+5** and #41,#30,#25* at **+4**) reflect an egalitarian perspective that no distinction should be made between age groups, socio-economic groups or those with and without dependants. The only exception to this overarching principle is individuals who abuse their treatment and forgo their entitlement, as in statement #6, which is distinguishing for this factor. Salient statements in this account are about *need* (#41, #30) and the *equal value* of different lives (#11*, #25*). Comments made by respondents who are strongly associated with this factor reinforce the interpretation of this as a rights-based, egalitarian perspective:

> "Health care should be open to all regardless of age or social position." ID10 (written comments)
>
> "Everybody should be entitled to the same care whether they are a smoker, drinker, overweight or anything else." ID14 (written comments)

The statements most rejected in factor 1 are arguments which distinguish between patients on the basis of their characteristics such as age, socio-economic status or lifestyle (see #20[**-4**,-2*,-4]; #24[**-4**, -4, -4]; #16[**-5***,-1,-3]). Importantly amongst these are consequentialist arguments which relate to outcome such as #14[**-4***,-2*,-1*] which prioritises children on the grounds that greater benefits will be realised, or statement #3[**-5**,-1*,-3] which implies a gain in overall health by treating people who live a healthy life. Efficiency, in this account, is traded-off for equality of access to health care.

## Factor 2: Maximising health benefits and the rejection of socio-economic factors

The second factor is a consequentialist viewpoint focussed on the outcomes of health care in terms of quality of life, life expectancy and the magnitude of health benefits from treatments (#29 [3,**5***,2], #31 [2*,**4**,4], and #44 [1*,**4***,-3*]). It is not concerned with principles of entitlement or deservedness #15[5,**-1**,3]; #21[-1,**-4***,-2] and is indifferent to the distribution (#34[-2,**-1**,1]; #22[-1,**-1**,2*]) and processes of health care resource allocation (#35[-3,**0***,3*]). Rather, treatments which generate the largest improvements in quality of life and life expectancy should be prioritised in order to generate the greatest benefit. Preventive health care is important in all factors but in this account it appears to be linked to concerns which are foremost about the efficient use of resources (maximising health outcomes or minimising costs) in the long term:

> "Preventive health care is fundamental. I perceive obesity as being a major drain on future NHS budgets unless tackled, due to it leading to 'costly conditions' such as heart disease and diabetes." ID23 (written comment)

In contrast with factor 1, age *is* considered a relevant attribute but only in the specific cases where the youth of patients confers a larger health gain (#10[-2,**2***,0] and #14 [-4*,**2***,-1*]) (although these distinguishing statements are only moderately ranked). In contrast to factors 1 and 3 there is also some support for prioritising people with dependants (#20 [-4,**2***,-4]; #25 [4*,**-2***,2]). Since the overall interpretation of this factor relates to a general concern for efficient use of resources, it is plausible that this might also be related to an efficiency argument. Caring for dependents, should they become sick, has associated costs and perhaps wider negative effects on welfare.

The health maximising viewpoint represented by factor 2 is combined with strong opposition to statements about patients' socio-economic status. All six statements placed at -4 and -5, relate to the socio-economic status of patients and four significantly distinguish this factor (#18[0,**-4***,-1]; #21[-1,**-4***,-2]; #24[-4,**-4**,-4]; #9[-2,**-4**,-5*]; #26[-1,**-5***,-3]; #28[-3*,**-5***,-1*]. It is not appropriate to address socio-economic inequities by prioritising health care for the poor, nor is it acceptable to reward citizens' contributions to the health service, or their productivity via the health system. Private payment for health care is also ruled out, and the rejection of statement 28 (which implies that if some patients make a financial contribution to their treatment then more patients could benefit) is a marked exception to the health maximising arguments otherwise characterising factor 2.

## Factor 3: Preventive health, saving life and caring for children and the vulnerable

Factor 3 shares some of values described in factors 1 and 2 but has distinct features which set it apart from the other accounts. The two statements placed at +5 (#23 and #40), dominating the upper tail of the factor array, emphasise the importance of prevention. There are concerns, as in other accounts, with health benefits (#31) and with need (#41), but there is also an intrinsic value placed on life itself in this account and on saving life even where quality of life is poor. Statement #44 [1*,4*,**-3***] is rejected only in factor 3.

There is also an evident concern for those who might be vulnerable. Statement #13 [0,0,**4***] expresses priority for children. For this factor, age is not connected with health benefit (#14 does not feature here), but rather a special case is made for children *per se* – a view which is reflected in one respondent's words after sorting the cards:

> "The health of children must be the main priority with the second being the elderly." ID7 (respondent comments).

Similar patient groups who warrant special concern are those who are unable to care for themselves (#32[2,-3*,**3**]) (distinguishing factor 3 at $p<0.05$) and those for whom no other treatments are available #33 [-1*,-3*,**2***].

On further examination of the statements that significantly distinguish factor 3, statement #35 [-3,0*,**3*]** is important for this factor alone. Whilst expressing

preferences over health care priorities in their Q sorts, respondents associated with this factor believe that such decisions should be made by experts and not members of the general public.

# 3 STUDY 2: Q BLOCK SURVEY

The objective of study 2 is to investigate methods to estimate the distribution of the three factors (identified in study 1) in a large survey of the UK population using quantitative, 'Q block' survey methods first described by Talbott (1963).

## 3.1 Methods

Completing a full Q sort is time consuming and Q block methods were devised as a means of approximating factor associations in large respondent samples (Baker et al (2010b)). Statements that *characterise* each of the factors emerging from a Q study are selected from the Q set. These are presented to respondents in small 'blocks' for rank ordering with each block containing one statement that characterises each of the factors (in this study there are three statements in a block). Respondents' preferences over the blocks of statements are taken together to indicate their likely association with each factor. An implicit assumption in this method, therefore, is that if respondents prefer statements which are strongly associated with factor 1, for example, they would likely hold views similar to those represented by factor 1 as a whole.

*Selection of statements for inclusion in Q blocks*

From the complete set of 46, statements were selected for inclusion in Study 2 that were:

a) 'distinguishing' (i.e. statements characterizing one factor from the other two), *and*

b) 'salient' (i.e. a strongly held, positive or negative view, interpreted here as a statement with a factor score of +/-3 or higher).

Twenty statements satisfied both of these criteria for at least one factor and, from these, statements were selected in order of salience (i.e. statements with the highest factor scores) for each factor until no new blocks could be generated. In this way four Q block questions were constructed. Following Talbott (1963), positive (negative) statements were grouped together in blocks and not mixed together within a block. Appendix B details the wording of the Q block questions and the statements in each block together with additional information (shaded) which was not presented to respondents. The original statement numbers are shown in the first column and the factor scores (the positioning of each statement in the composite Q sorts from study 1) are reproduced in the three right-most columns.

The Q block questions were presented to respondents in random order, by trained interviewers in respondents' homes, towards the end of a computerised questionnaire. The survey was administered to a sample of respondents (n=587), generated from the population of adults (18+) living in England using random

probability sampling, by a survey organisation (NatCen) between February and April 2007.

*Analysis of Q block data*

Following Talbott (1963) we present a straightforward method for scoring Q block data, assigning individuals to a single factor according to their highest score. Scores are calculated for each respondent, for each factor, based on their rankings of each of the four "blocks" shown in Appendix B. The most preferred factor in each block is given a score of 12, the second most preferred a score of 5 and the least preferred a score of 1.

## 3.2 Study 2 findings

542 respondents gave complete responses to the Q block questions. The sample comprised more women (57%) than men and an average age of 52. Just over half of the sample were employed, and 28% had children. Based on responses to the EuroQol EQ5D questionnaire (EuroQol Group, 2012) 47% of respondents were in full health.

[TABLE 3 ABOUT HERE]

The results are shown in Table 3. 494 of 542 (91%) of respondents were assigned to a single factor. and 48 respondents' scores were tied across two factors. All three factors are represented by a large proportion of the sample and none could be

described as a 'minority viewpoint'. However, factor 3 is the most common with 36% compared with 23% and 33% assigned to factors 1 and 2 respectively.

# 4 DISCUSSION

In the face of scarce resources societal values with respect to health care priorities is of significant interest to researchers, policy makers and to bodies such as NICE. Addressing both the *nature* and the *distribution* of subjective opinions involves qualitative and quantitative research questions. In this paper we combine qualitative and quantitative techniques within a single Q methodological framework and illustrate its application in the context of eliciting perspectives regarding the principles underlying health care priority setting. In study 1 we elicit and describe three perspectives, highlighting the plurality of views around the (often emotive) subject of distributional equity and health care. In study 2 we report the first, real application of an approach to Q survey research ('Q block methods') to explore the distribution of those views in the general population.

There are a number of potential advantages of Q methodology over other approaches. Like qualitative methods, Q methods enable the rich description of views about a specific subject matter. Given that there is likely to be more than one way of looking at any subject, it is possible that individuals might have some sympathy with more than one prevailing view (Wolff, 2011). By examining

quantitative information (e.g. factor loadings) we can examine the strength of association between individuals' views (as expressed through their Q sorts) and the range of perspectives that exist in a population. Q techniques also permit the identification of consensus issues and in the study reported here there are a number of issues about which there is agreement, for example the irrelevance of socio-economic status in prioritising health care and the importance of prevention. This may be useful in policy making since policies based on issues of consensus are unlikely to generate controversy.

If societal views (once identified) could be easily measured in a population, it would provide useful information for public bodies, such as HTA agencies, who seek the 'voices' of members of the public in processes of participative democracy. Participants in panels, focus groups or committees (such as NICE's Citizens Council) could be selected so that different *perspectives* are represented as well as (or instead of selection according to) socio-demographic characteristics. Cuppen et al. (2010) used Q methodology to identify the range of perspectives (about an environmental issue) and select stakeholder-participants on this basis. They showed that selection based on characteristics is unlikely to lead to representation of the range of perspectives.

Methodologically there are also issues which warrant further discussion. There are potential limitations and methodological discussion points raised by our approach. The design of the statement set is crucial in Q methodology and no set of statements will be 'perfect'. The aim is to represent the *conversational possibilities* around the issue in question and statements are intended to retain respondents' own language

as far as possible – as such they tend to be open to interpretation and less tightly controlled than questionnaire items, for example. It is important that the statements provide sufficient coverage of the relevant issues so that respondents are able to express their views through the Q sort. Piloting is essential to establish whether there are items missing or respondents who find difficulty in representing their views through the Q set. Even with careful adherence to the principles of Q set design, however, there are some types of statement that can create problems either for respondents Q sorting or for analysts interpreting findings. Negative statements, "I do not think that..." or "I disagree that..." can be problematic, since placing them in the negative pole of a Q sort grid implies a confusing double-negative. Commonly, statements will argue that something is true and give a reason (I think X because of Y) and the inclusion of this kind of statement requires judgement by the researcher. On the one hand they are problematic because respondents may agree with the view (X) but disagree with the rationale (Y). On the other hand, there might multiple different rationales (Y) for believing X to be true, none of which make sense except in the context of X, in which case including such statements may be necessary (as in this Q set in the case of 'age' (see statements 10, 13, 14, 16, 21)). We do not think these statements generated problems in this Q study – no respondents complained of difficulties placing these statements in either the pilot or full study. If respondents do not recognise their own views in statements they will tend to be placed in the central columns of the Q grid and will not be important in the resulting factors.

However, care should be taken in the interpretation of statements such as these within a factor array.

It has been noted that sample sizes in Q methodological studies are based on considerations similar to the notion of 'data saturation' employed in qualitative research. In Q terms, recruitment of respondents would cease when factors have been defined and additional Q sorts add little to their interpretation. Hence Q studies require relatively small respondent samples. As a rule of thumb, 4 or 5 respondents with significant, pure factor loadings on each factor would be required. As such the sample of 27 respondents in this example is regarded as a minimum and we cannot rule out the possibility that purposive selection of additional respondents may have generated a fourth factor.

In study 2 we selected statements which characterised the factors and applied a simple scoring method to Q-survey data which aims to assign survey respondents to a unique factor. However, whilst individuals *can* be assigned to unique factors it is likely that, to some degree, they are sympathetic to a combination of factors. Indeed, the findings of study 1 demonstrate that several people agreed with more than one factor to a greater or lesser degree (see Table 2). Similarly, all 46 statements are associated, positively or negatively, to a greater or lesser degree, with every factor (signified by the factor scores in Table 1). The notion that individuals are not exclusively associated with one factor but partially with all factors is conceptually similar to the notion of "fuzzy set" or "grade of membership" approaches (Ragin, 2000) where variables represent the degree of proximity of observations to latent

classes. Q methodology has the potential for analysis of both the frequency and distribution of respondents associated with each perspective in a population and the strength of that association. We have demonstrated the potential in a simple analysis which assigns respondents to factors and examines the distribution of factors in a population that results from this simple approach. Future research will develop methods which make use of the correlations between individuals and each factor, and the relative importance of statements within factors, to be integrated in the analysis of Q survey data.

Lastly, the selection of statements for inclusion in Q block surveys is also an issue for debate and requires further methodological research (Baker et al., 2010b). Extracting even the most salient, distinguishing statements from a complete Q set, and presenting them in small blocks, may alter respondents' interpretations of those statements and their preferences over them.

Despite these methodological considerations, we have demonstrated that techniques associated with Q methodology can be used to address qualitative and quantitative research questions within a single analytic framework, which has huge potential for an array of research applications. Q methods and Q survey methods together represent an approach which has the potential to preserve depth and richness of societal perspectives whilst allowing quantification of the support for these perspectives in a wider population. Such information is crucial for those charged with the difficult task of guiding health care resource allocation.

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Brown (1980) is now out of print. It has been made available by the author for download as a pdf file at: http://qmethod.org/papers/Brown-1980-PoliticalSubjectivity.pdf

Talbott (1963) is a conference paper and is available on request from the authors. The approach is summarised and discussed in Baker (2010b), also available request.

*Table 1: Statements and factor scores with distinguishing and consensus statements highlighted*

| # | Statements | Factor scores | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| 1 | Whether or not an illness could have been avoided needs to be taken into account. The cause of the illness matters, more priority should be given to things arising from environmental causes and allergies. | 0 | -3 | -1 |
| 2 | Whether or not people have caused the illness themselves should not be relevant. If someone has got an illness through smoking, they are just as worthy of treatment as someone else. It's wrong for the health service to make moral judgements about people's lifestyles. | 1 | 3 | -1* |
| 3 | People who live a healthy lifestyle should be prioritised because they would respond better to treatment. | -5 | -1* | -4 |
| 4 | You can't prioritise health care on the basis of people's lifestyle – like not giving equal priority to smokers – where would you draw the line? Obesity? People who do dangerous sports? You just have to treat everyone who is ill the same regardless of lifestyle. | 3* | 0 | 0 |
| 5 | If some people have lung cancer through no fault of their own (e.g. because of their work, or environment) they should be given higher priority than people who get lung cancer because they smoke. | -3 | -2 | 0 |
| 6 | If someone is given treatment, like George Best, and then abuses their treatment, they should not be given repeated chances. If there are finite resources and a person has failed to take advantage of it, someone else should be given a chance. | 4* | 1 | 1 |
| 7 | People don't always have control over their lifestyles; it can be rooted in their background which causes problems of addiction or other things. It's not as simple as people choosing to damage their health. | 1 | 0 | 0 |
| 8 | Illnesses which have a negative impact on other people (e.g. the patients' families) should be given priority. | -2 | 1 | -2 |
| 9 | People who smoke and drink pay enough in extra taxes to pay for their own health care. | -2 | -4 | -5* |
| 10 | Sometimes you have to make decisions and sometimes you have to give priority towards younger people because improving health for an 80-odd year old might not make a difference to their lives. | -2 | 2* | 0 |
| 11 | Life is equally valuable whether you are young or old. | 5* | 1* | 3* |
| 12 | If people have had some treatment in the past for the same problem which hasn't resolved the problem, then they should be given priority for treatments. | 0 | 1 | -2* |
| 13 | Age shouldn't come into it, unless you're talking about children. Children's health should be given priority over adults. | 0 | 0 | 4* |
| 14 | The age of the patient is important; if you were treating children rather than older people then you would have a longer improved life. | -4* | 2* | -1* |
| 15 | Everybody, no matter what you are, whether you are young or old, should get the same access to and choice of treatment. | 5* | -1* | 3* |
| 16 | You should prioritise the younger age group, because they are still able to have children. | -5* | -1 | -3 |
| 17 | For relatively minor conditions patients who are of working age should take priority over people who are retired. | -3 | 1* | -4 |
| 18 | There should be 'positive discrimination' towards people who are disadvantaged and in ill health because they've got a lot to contend with already. | 0 | -4* | -1 |
| 19 | The important thing is that people can fulfil their 'role' in society, whatever that is - work, caring for people or housework. | 2 | 2 | 1 |
| 20 | People with dependants should be prioritised over people without | -4 | 2* | -4 |

| | | | | |
|---|---|---|---|---|
| | dependants because their treatments would benefit others as well as the patient themselves. | | | |
| 21 | Older people deserve to be given priority. They have been paying into the NHS all their lives, they deserve to be able to draw on those resources when they need it. | -1 | -4* | -2 |
| 22 | It's important to take into account how many people stand to benefit from a treatment. If the same health benefit could be given either to 10 people - each getting a large benefit -or 1000 people - each getting a small benefit - I would want to treat 1000 | -1 | -1 | 2* |
| 23 | Priority should be given to preventive health care especially education in schools about diet and lifestyle choices | 3 | 4 | 5 |
| 24 | Whether or not people are currently working should be taken into account when we prioritise health care. | -4 | -4 | -4 |
| 25 | People with dependants should not be given priority over people without dependants. A human life is a human life, I think it should be irrelevant how many dependants they've got. | 4* | -2* | 2 |
| 26 | Poorer people should be given priority because they don't have the same opportunities to take care of their own health. | -1 | -5* | -3 |
| 27 | People choose to have children - they shouldn't be prioritised over people who don't have children. Why should people be penalised for not having children? | 2* | -2* | 1* |
| 28 | Whether or not patients can contribute financially towards the cost of the treatment should be taken into account because it would allow you to treat more people who can't afford to 'go private'. | -3* | -5* | -1* |
| 29 | The quality of life of patients and their life expectancy are the most important things. The characteristics of patients like whether they are employed, or whether they have dependants, or what gender they are shouldn't matter. | 3 | 5* | 2 |
| 30 | Social class should make no difference whatsoever for prioritising health care. If people need treatment, they need treatment. How well off they are shouldn't come into it. | 4 | 4 | 4 |
| 31 | The amount of health and quality of life improvement is the most important. It's about getting the greatest benefit for the most people. | 2* | 4 | 4 |
| 32 | Priority should be given to people who can't take care of themselves and their own basic needs. | 2 | -3* | 3 |
| 33 | New treatments should be targeted towards diseases for which there is currently no other treatments available. Even if they are only of limited benefit, it's important that people get something. | -1* | -3* | 2* |
| 34 | It is more important to save one life than it is to improve the lives of many by only a small amount. | -2 | -1 | 1 |
| 35 | The decisions about which services to fund, and how to spend NHS money should be made by a range of experts with a lot of information and experience of the issues, not the general public. | -3 | 0* | 3* |
| 36 | The quality of life of patients before treatment is the most important thing. Priority should be given to people whose quality of life is the lowest, even if we can only improve it by a small amount. | 0 | -3* | 1 |
| 37 | You can't just say age matters or doesn't matter. There are so many other things that you would want to know about the treatment. It's complex and you can't take one thing in isolation. | 2 | 3 | 2 |
| 38 | Priority should be given to treatments without side effects. It's important that health care does no harm to people. | 1 | 2 | 0 |
| 39 | Treatments which add years to life are more important than treatments which only have an impact on quality of life. | -1 | -2 | -2 |

| | | | | |
|---|---|---|---|---|
| 40 | Priority should be given to preventive health care rather than always focussing on cure once people are ill. | 3* | 5 | 5 |
| 41 | Health care should be based on need, not on social circumstances, or addiction or weight or smoking or anything else. | 4 | 3 | 4 |
| 42 | If you're prioritising health services it should just be based on the principle that a person is in a queue and it's their turn, not anything about the people themselves. That's the fair way. | 0 | -2 | -3 |
| 43 | I would want to consider how stressful a treatment is and prioritise treatments which would 'disturb' the patients less, which were less invasive. | 1 | 3 | -2* |
| 44 | It's no good saving lives if the quality of those lives is really bad. Some treatments are keeping people alive for too long. You've got to have a decent quality of life otherwise what's the point of being alive. | 1* | 4* | -3* |
| 45 | It's important to consider whether or not someone has dependants when you're prioritising health care, because if something happens to them then something will have to be done for their dependants. | -2* | 0 | 0 |
| 46 | People who have already benefited from a lot of health care should take second place to people who have not used the health service as much. | -4 | 0* | -5 |

[a] * denotes those statements which distinguish each factor from the other two factors ($p<0.01$).

[b] Shaded statements are consensus statements which do not distinguish between any two pairs of factors (non-significant at $p>0.01$).

*Table 2: Factor loadings: Factor matrix with X indicating a defining sort*

| ID | m/f | Age | Factor loadings | | |
|---|---|---|---|---|---|
| | | | F1 | F2 | F3 |
| 1 | m | 44 | 0.02 | 0.44*x | 0.37* |
| 2 | f | 52 | 0.07 | 0.56*x | 0.43* |
| 3 | m | 84 | 0.51* | 0.12 | 0.52* |
| 4 | m | 59 | 0.04 | 0.40*x | 0.14 |
| 5 | m | 58 | 0.43* | 0.42* | 0.20 |
| 6 | f | 52 | -0.29 | -0.57*x | 0.21 |
| 7 | m | 63 | 0.28 | 0.35 | 0.65*x |
| 8 | f | 56 | 0.60*x | 0.30 | 0.43* |
| 9 | f | 42 | 0.24 | 0.28 | 0.27 |
| 10 | m | 48 | 0.75*x | 0.04 | 0.16 |
| 11 | m | 36 | 0.35 | 0.33 | 0.53*x |
| 12 | m | 39 | 0.60*x | 0.14 | 0.32 |
| 13 | m | 53 | 0.36 | 0.04 | 0.47*x |
| 14 | f | 40 | 0.73*x | 0.36 | 0.10 |
| 15 | m | 20 | 0.50*x | 0.20 | 0.42* |
| 16 | m | 58 | 0.10 | 0.84*x | 0.07 |
| 17 | f | 41 | 0.73*x | 0.30 | 0.26 |
| 18 | f | 50 | 0.55*x | 0.45* | 0.22 |
| 19 | m | 25 | 0.12 | 0.29x | 0.26 |
| 20 | f | 22 | 0.65*x | 0.27 | 0.18 |
| 21 | f | 42 | 0.68*x | -0.02 | 0.34 |
| 22 | f | 26 | 0.36x | -0.01 | 0.23 |
| 23 | m | 37 | 0.52* | 0.52* | 0.16 |
| 24 | m | 28 | 0.44* | 0.11 | 0.58*x |
| 25 | f | 45 | 0.24 | 0.27 | 0.57x |
| 26 | m | 35 | 0.19 | 0.24 | 0.35x |
| 27 | m | 27 | 0.21 | 0.00 | 0.66x |
| Eigenvalues | | | 9.64 | 1.58 | 1.37 |
| % Explained variance | | | 20 | 12 | 14 |

[c] Significant loadings are shown in indicated by *. The significance level for factor loadings is taken as 2.5 (SE). SE represents Standard Error which is defined as $1/\sqrt{N}$ where N is the number of statements in the Q set. In this case then, 2.5 (SE) = 2.5 $(1/\sqrt{46}) = 0.37$

[d] Defining sorts are identified by x. The automatic flagging procedure in PQmethod software was used to identify defining sorts which flags according to the following rule:
Flag loading ***a:***
***if*** **(1)** $a^2 > h^2/2$ (factor 'explains' more than half of the common variance)
***and*** **(2)** a > 1.96 / SQRT(nitems) (loading 'significant at p>.05'). Note that manually 'unflagging' Q sorts with mixed loadings in this analysis (e.g. respondents 1 and 2) had little impact on the interpretation of the three factors.

*Table 3: Talbott Q block scoring method*

| Factor | Scores 1, 5, 12 | |
|---|---|---|
| | Count | (%) |
| F1 | 123 | (23) |
| F2 | 178 | (33) |
| F3 | 193 | (36) |
| F1F2 | 10 | (2) |
| F1F3 | 18 | (3) |
| F2F3 | 20 | (4) |
| F1F2F3 | 0 | (0) |

*Figure 1: Q sort response grid*

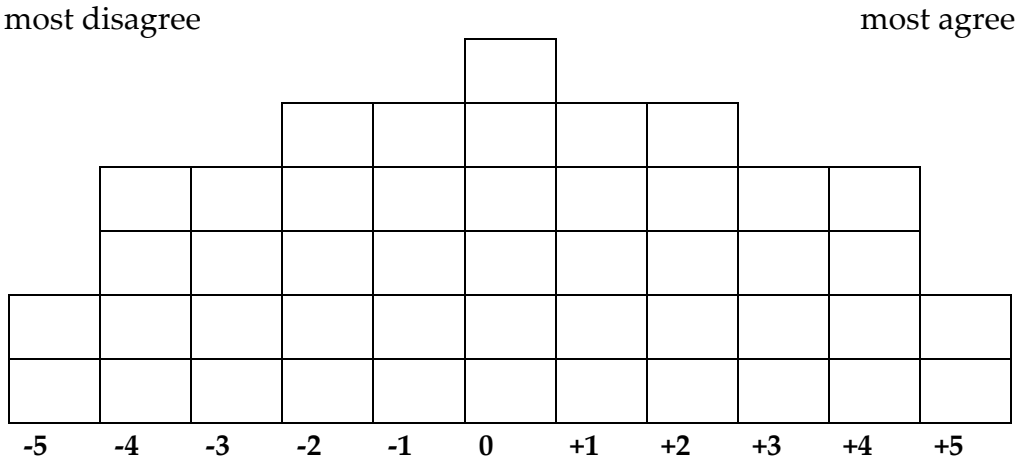

*Figure 2: Factor Arrays:*

Factor 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 13 | | | | | |
| | | | 10* | 33** | 36 | 7* | 27** | | | |
| | 24 | 35** | 8 | 21 | 1 | 43* | 37 | 4** | 41 | |
| | 14** | 5* | 9 | 22 | 12 | 2 | 31** | 40** | 30 | |
| 16** | 46 | 28** | 34* | 39 | 42 | 44** | 19 | 29 | 6** | 11** |
| 3 | 20 | 17 | 45** | 26 | 18 | 38 | 32* | 23* | 25* | 15** |
| **-5** | **-4** | **-3** | **-2** | **-1** | **0** | **+1** | **+2** | **+3** | **+4** | **+5** |

Factor 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 46** | | | | | |
| | | | 25** | 34* | 7 | 17** | 20** | | | |
| | 9 | 32** | 5 | 15** | 13 | 6 | 19 | 41 | 23 | |
| | 21** | 1* | 27** | 3** | 4 | 12 | 38 | 43* | 30 | |
| 26** | 24 | 33** | 39 | 22 | 35* | 11** | 10** | 37 | 31 | 40 |
| 28** | 18** | 36** | 42 | 16 | 45 | 8* | 14** | 2 | 44** | 29** |
| **-5** | **-4** | **-3** | **-2** | **-1** | **0** | **+1** | **+2** | **+3** | **+4** | **+5** |

Factor 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 38 | | | | | |
| | | | 21 | 18 | 10* | 27** | 37 | | | |
| | 17 | 26 | 43** | 1 | 45 | 34* | 29 | 11** | 31 | |
| | 3 | 16 | 8 | 2* | 4 | 36 | 22** | 35** | 30 | |
| 46 | 24 | 44** | 39 | 14** | 7 | 19 | 25* | 15** | 13** | 23 |
| 9** | 20 | 42 | 12** | 28** | 5 | 6 | 33** | 32* | 41 | 40 |
| **-5** | **-4** | **-3** | **-2** | **-1** | **0** | **+1** | **+2** | **+3** | **+4** | **+5** |

*Note * denotes those statements which distinguish factor 1 from factors 2 and 3 ($p<0.05$); ** marks a significance level of $p<0.01$; and consensus statements are shaded.*

## Appendix A: Glossary

| Term | Definition |
|---|---|
| Q set | The set of items/ statements, usually transcribed onto cards, which respondents are asked to sort according to the condition of instruction. |
| Condition of Instruction | All Q sorts are conducted according to some condition of instruction i.e. direction to sort with reference to some specification such as sorting the cards representing your own point of view, from those which are "most like me" to those which are "most unlike me". |
| Q sort | The arrangement of items or statements by respondents according to the condition of instruction. Can be forced or unforced and administered by interviewer or self completion. |
| Factors | Factors are analytic constructs calculated using correlations to reduce a number of variables to a smaller number of underlying dimensions. In Q methodology each factor is a distinct account relating to the topic studied, which can be represented by a 'composite' or 'idealised' Q sort (factor array). |
| Factor array | The composite Q sort representing a factor, derived from weighted averages of individual Q sorts. (Non-significant and mixed loaders (i.e. sorts which have significant loadings on more than one factor) are not included. (Factor loadings are considered significant ($p<0.01$) above $2.58(1/\sqrt{N})$). |
| Factor loadings | Factor loadings are correlation coefficients representing the degree of concordance between an individual Q sort and a factor. |
| Factor scores | Scores given in the composite Q sort corresponding to the original values used in the Q sort (e.g. -5 to +5). |

## APPENDIX B

The next four questions are a little different. You will be shown 3 statements each time. These statements are things that members of the public have said about how health services should be prioritised. You will agree with some of these and disagree with others. There are no right or wrong answers. For each question, first read through the 3 statements on the show-card carefully. When asked, give the number of the statement that you agree with most. Then from the two statements that are left you will be asked to give the number of the next statement you agree with the most. Finally the one remaining statement should be the one you agree with least.

| # | Statement text | Factor scores | | |
|---|---|---|---|---|
| | | F1 | F2 | F3 |
| Q 1 | | | | |
| 15 | Everybody, no matter what you are, whether you are young or old, should get the same access to and choice of treatment. | 5* | -1* | 3* |
| 29 | The quality of life of patients and their life expectancy are the most important things. The characteristics of patients like whether they are employed, or whether they have dependants, or what gender they are shouldn't matter. | 3 | 5* | 2 |
| 13 | Age shouldn't come into it, unless you're talking about children. Children's health should be given priority over adults. | 0 | 0 | 4* |
| Q 2 | | | | |
| 25 | People with dependants should not be given priority over people without dependants. A human life is a human life, I think it should be irrelevant how many dependants they've got. | 4* | -2* | 2 |
| 20 | People with dependants should be prioritised over people without dependants because their treatments would benefit others as well as the patient themselves. | -4 | 2* | -4 |
| 35 | The decisions about which services to fund, and how to spend NHS money should be made by a range of experts with a lot of information and experience of the issues, not the general public. | -3 | 0* | 3* |
| Q 3 | | | | |
| 16 | You should prioritise the younger age group, because they are still able to have children. | -5* | -1 | -3 |
| 28 | Whether or not patients can contribute financially towards the cost of the treatment should be taken into account because it would allow you to treat more people who can't afford to 'go private'. | -3* | -5* | -1* |
| 44 | It's no good saving lives if the quality of those lives is really bad. Some treatments are keeping people alive for too long. You've got to have a decent quality of life otherwise what's the point of being alive. | 1* | 4* | -3* |
| Q 4 | | | | |
| 14 | The age of the patient is important; if you were treating children rather than older people then you would have a longer improved life. | -4* | 2* | -1* |
| 26 | Poorer people should be given priority because they don't have the same opportunities to take care of their own health. | -1 | -5* | -3 |
| 9 | People who smoke and drink pay enough in extra taxes to pay for their own health care. | -2 | -4 | -5 |

*Note: The areas shaded above were not seen by respondents who were simply presented with the question text followed by three statements per question, presented in random order*